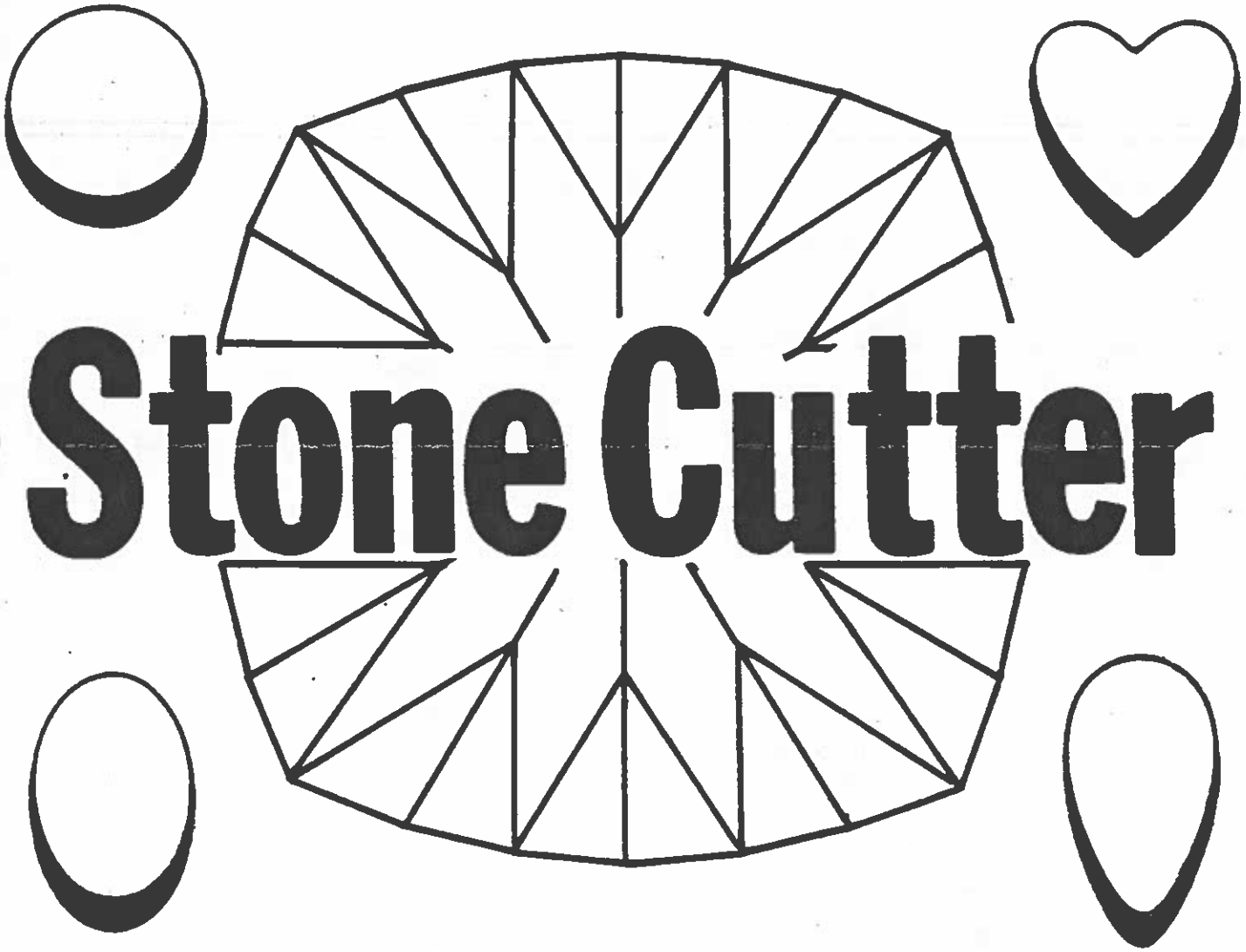
NORTH CAROLINA LAPIDARY SOCIETY

July
1983



Stone Cutter

MEETINGS: SUNDAY
Third ~~Thursday~~ each month.
GEMCRAFTERS
2106 Patterson St.
Greensboro, NC 27407

SOUTHEAST FEDERATION MINERALOGICAL SOCIETIES, INC.

THERE WILL BE NO MEETINGS OF NCLS

FOR THE MONTHS OF JULY AND AUGUST.

THE NEXT MEETING WILL BE SEPT. 18, 1983.

OFFICERS 1983

PRESIDENT	:	
VICE PRES.	:	DENNIS WALTERS Rt. 3 University Estates Reidsville, NC 27320
SECRETARY	:	PAULINE E. KEENEY 1811 Alderman Dr. Greensboro, NC 27408
TREASURER	:	THOMAS J. RICKS Rt. 3 Box 347 Liberty, NC 27298
MEMBERSHIP SECRETARY	:	ELEANORE LARSON 2513 Celeste Dr. Greensboro, NC 27407
BULLETIN EDITOR	:	THOMAS J. RICKS Rt. 3 Box 347 Liberty, NC 27298

EXECUTIVE BOARD meets at the call of the president.

MEMBERSHIP DUES : $12.00 per year - prorated quarterly.

STONE CUTTER subscriptions: $5.00 per year.

STONE CUTTER advertising rates: full page, $40.00: half page $20.00; quarter page, $10.00.

SOUTHEAST FEDERATION

You may recall hearing of "Andy's Dream", (SFMS 1st V. P. Andy Clark). Andy envisioned a workshop-retreat just for SFMS and his dream is coming to be! SFMS President, Sparky Sparks and two rockhound friends have formed a corporation and signed papers to buy about 80 acres of land and will begin building in June. Their corporation is called the Bill Holland Foundation, and is a private corporation, not a part of SFMS, although SFMS will get the benefits.

The location of this workshop-retreat is in Georgia about five miles from Tennessee. It is about 50 miles north of Gainesville and about 100 miles northeast of Atlanta. It is in the boondocks, in the Chattachoochee National Forest, a couple of miles northeast of a small town called Young Harris, Georgia.

To help finance this, they are offering 15 one-acre plots next to the retreat for sale to SFMS rockhounds for $10,000 per acre. Owners of these parcels will be able to participate in any workshops.

Construction begins in June on a Wildacres-type lodge with a basement for a cafeteria (100 people) and about ten classrooms. The building will be 192 x 42 feet, with 28^{m} double occupancy rooms, each about 14½ x 17½, with central heat and fans. There will be parking for 200 cars and full hook-ups for 12 campers.

They envision having one week workshops from May through November for 50 people per session, with perhaps one or two clubs reserving a week for them alone. Costs are estimated to be $125/week/person. Instructors will get free room and board and possibly a small stipend besides. It should be ready for the 1984 season.

You may be wondering about the liability insurance that has been provided for all club activities. This insurance is free as far as the clubs are concerned provided they have paid their SFMS dues. The insurance will cover the club and officers against liability for any injuries received in any club sponsored rockhound activities. Detailed, printed information on this insurance will be available at the Annual Convention in September.

Speaking of insurance --- we are in receipt of a nice letter from Mr. Stuart Bowers of the Withlacoochee Rock Club (one of the newest members of SFMS) and he says that due to the insurance their club has been permitted to again go into a mining area that had been previously closed to them and they have prospects of being able to enter more closed facilities now that they have insurance. They didn't know what they had been missing until their club joined the Southeast Federation.

SFMS now has a total of 72 clubs!

The next quarterly meeting of Southeast Federation will be held June 25th at the CHAPEL OF THE CROSS, 304 Franklin Street, Chapel Hill, N.C.

The annual Convention of SFMS will be in Chattanooga, TN on Friday and Saturday, September 23rd and 24th.

The last quarterly meeting of this year will be held in the new work-shop-retreat at Young Harris, GA.

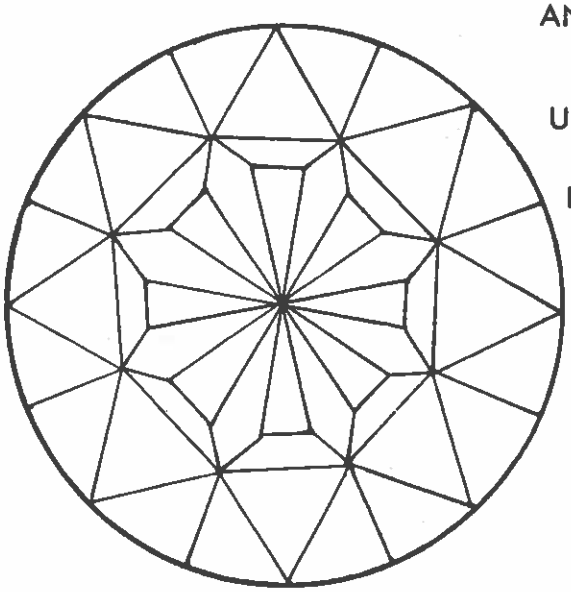
Double Rose Cut

for 15 mm. or more

Submitted by:

Margaret (Mrs. J.D.) O'Connor

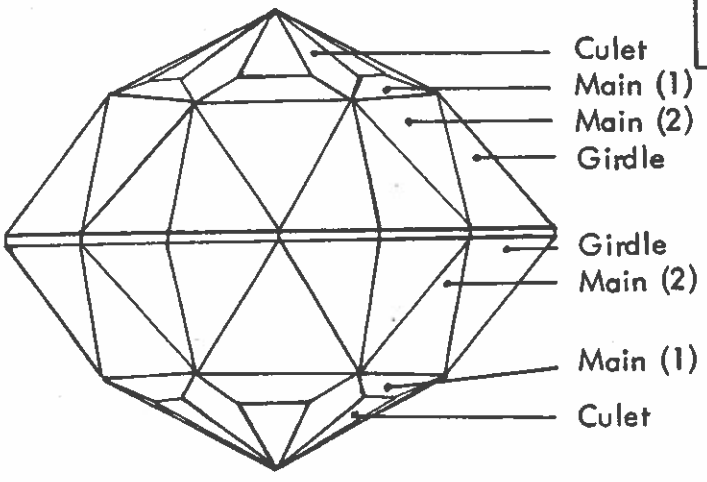
from The FACETIER, November, 1973



ANGLES ARE FOR QUARTZ

USE A 64 INDEX GEAR

Double Rose has 96 facets



ANGLES		INDEX
Main (2)	45°	8 - 16 - 24 - 32 - 40 - 48 - 56 - 64
Main (1)	35°	8 - 16 - 24 - 32 - 40 - 48 - 56 - 64
Culet	28°	4 - 8 - 12 - 16 - 20 - 24 - 28 - 32 36 - 40 - 44 - 48 - 52 - 56 - 60 - 64
Girdle	55°	2 - 6 - 10 - 14 - 18 - 22 - 26 - 30 34 - 38 - 42 - 46 - 50 - 54 - 58 - 62

When cutting the Double Rose make sure the crown facets and pavilion facets match when cutting second side. The stone looks better if the girdle is cut and polished to match the crown facets.

This is a lovely cut for coloured material and would be a good pendant stone.

By faceting only the crown and cutting the pavilion flat you would have a Single Rose cut used for opaque materials.

ED. NOTE: The following article, copied from the Newsletter of the T. E. R. C. Rocks and Minerals Club, was edited from Kirk-Othmer's ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY, Third Edition, Volume 11.

SYNTHETIC GEMS

Until very recent times, precious stones were obtained by prospecting, exploration, and mining. Today, many traditional gemstones can be produced in the laboratory, including diamond, sapphire, ruby, and emerald. Such gems are called synthetic gemstones since they are of exactly the same chemical composition and structure as the stones occurring in the earth's crust. Artificial or imitation gemstones, on the other hand, are gemlike materials that only have an appearance similar to a particular natural gem.

The first synthetic gemstones were successfully made by Marc Gaudin in 1837. At the present time, commercial sizes and quantities of synthetic ruby, sapphire, emerald, and opal are readily available on the market; diamonds, however, although routinely produced commercially for use as abrasives, are not generally available in sizes suitable for gemstones.

Synthetic gemstones can be separated into the classical synthetics, which are identical to those found in nature, and diamond substitutes. The latter are synthetic crystals which may or may not be found in nature but that appear somewhat like diamond.

THE SYNTHETIC GEM INDUSTRY

The mainstay of the synthetic gem industry has for many years been the marketing of ruby, sapphire and spinel for birthstones and class rings. Sapphire and spinel are both readily produced in a very wide variety of colors which imitate other gemstones. Simulated amethyst, topaz, alexandrite, and many other imitations are produced by the addition or deletion of very small amounts of selected impurities.

These crystals are usually produced by the Verneuil or flame-fusion process, which requires large amounts of expensive hydrogen and oxygen, the manufacture of which is power-intensive. The availability of cheap hydroelectric power has strongly influenced the location of facilities producing hydrogen and oxygen and consequently of gemstone plants. The cutting and polishing of sapphire and spinel can be quite costly in terms of labor and cottage industries, individual small businesses that produce large amounts of gemstones with low labor and overhead costs, are abundant in Europe and in the Near and Far East.

An important development in the gemstone industry was the introduction of the star sapphire by the Linde Division of Union Carbide in the 1940s. It was marketed under the name Linde Stars until the early 1970s. Star sapphires are now primarily produced in Japan, Europe, and Israel. These stones achieved great popularity and market acceptance even in the difficult area of men's jewelry. Star sapphires were originally sold in the traditional sapphire blue, followed by red (star ruby), white, and black stars. Later, the stones were marketed in a variety of hues of blue and red and also yellows and greens.

The first synthetic gem to be accepted for use in fine jewelry was emerald produced by Carroll Chatham (San Francisco) in the 1940s. The process was not patented and is a closely guarded secret. The technique is almost certainly a flux-growth method and is believed to require a year per batch.

A minor revolution has taken place in the synthetic gemstone market over the last ten years with the introduction and increasing acceptance of simulated diamonds of very high quality. These new stones were partly the result of the intensive research into laser crystals since the early 1960s. Unquestionably, the best diamond substitute is the recently introduced cubic zirconia with optical properties close to those of diamond and closer than those of any other synthetic so far. Cubic zirconia can hardly be differentiated from diamond, although it has over one and one-half times the specific gravity of diamond. This fact has already had significant economic implications because of widespread swindling practices. Consequently, a device has been developed to measure the thermal conductivity of mounted stones in order to determine whether they are genuine diamonds.

SYNTHETIC GEMS, con't.

PROPERTIES

The properties desired for good gemstones are hardness, high refractive index, high dispersion, color, and clarity. Hardness greater than about 6 on Mohs scale is required in order that a gem can be worn without its surface being easily scratched and dulled. Some stones, eg, opal and turquoise (hardness, 5-6), are acceptable because of their great beauty. High refractive index or brilliance is sought for its light gathering and reflecting ability although this is not as important for a highly colored stone. Dispersion is the rate of change of the refractive index with wavelength. This property is referred to as fire in gem terminology since it determines the degree to which white light is separated into colors .

Manufacture

VERNEUIL PROCESS. In the Verneuil process, a seed crystal is placed upright in a ceramic, insulated furnace and an oxyhydrogen flame is directed from above on the seed. When the seed is slightly molten on its upper surface, the raw material (Al_2O_3, for sapphire) in very finely divided powder form is sprinkled downward onto the molten cap. The powder melts and forms part of the liquid adhering to the upper tip. As the process continues, the seed is very slowly lowered and more powder is added. As the liquid reaches a cooler zone, it solidifies and a crystal is built onto the seed. Dopants used to produce colored stones (or titania for stars) are mixed as oxide powders into the raw material (host) powder as homogeneously as possible in a very fine state.

Verneuil-grown crystals can be readily identified by using Schlieren photographs which show striations of color (in doped stones) perpendicular to the direction of growth. Occasionally, bubbles and powder slugs are also present, ie, regions in which powder has been encapsulated but not melted. Both striations and defects can frequently be detected with a magnifying lens. Although numerous techniques are available, the Verneuil process is the most widely used for gemstone production.

HYDROTHERMAL TECHNIQUE. In the hydrothermal method, patented by Union Carbide, seed crystals are cut into slabs and suspended near the top of a pressure vessel lined with a noble metal. For the production of synthetic emerald, for example, seed crystals may be synthetic emerald or, usually natural aquamarine. BeO, Al_2O_3, and SiO_2 are placed in the bottom of the vessel together with a small quantity of Cr_2O_3. Slightly acidic water solution is added and the vessel is sealed. The container is heated to 500-600° C with a slight thermal gradient (the bottom hotter than the top) imposed to promote convective circulation. Pressures develop internally to 100 MPa (ca 1000 atm) and vessel design is of paramount importance to accommodate these pressures. The nutrients at the bottom are dissolved and transported to the cooler top where the seeds are suspended. Growth occurs on the seed slab surfaces and a sandwich is built up having the seed as its center layer.

CZOCHRALSKI PROCESS. In the Czochralski process, for example for YAG, the raw material, Al_2O_3 and Y_2O_3, is melted in a noble-metal crucible, usually by induction heating. When the material is molten, a seed crystal attached to a rod is lowered from above to contact the melt surface. The temperature is adjusted so that the seed and liquid are in equilibrium and the seed is very slowly withdrawn. As the seed moves upward, a meniscus of liquid is lifted up and cooled (primarily by radiative losses), crystallizing onto the seed tip. This new solid material in turn forms a meniscus as the process continues and more crystal is added.

To be concluded -

"The Diana"

Submitted by - Michael R. Cichocki
22329 St. Gertrude
St. Clair Shores, MI 48080

USE A 96 INDEX GEAR

ANGLES ARE FOR QUARTZ

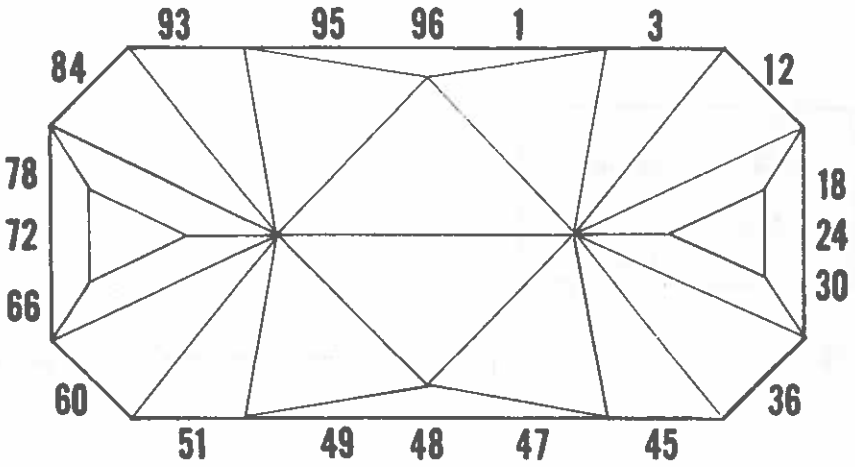
From The FACETIER, November, 1972

Mr. Cichocki recommends cutting the Pavilion first.

ANGLES	INDEX
90%	96-48-24-72 12-36-60-84
43% 43% 43%	12-36-60-84 96-48 24-72
43 1/2% 43 1/2%	93- 3 45-51 78-66 30-18
43%	47-49 95- 1
47%	96-48 Polish In
42%	96-48 Polish In
70%	72-24
48%	72-24

Polish in reverse order of cutting

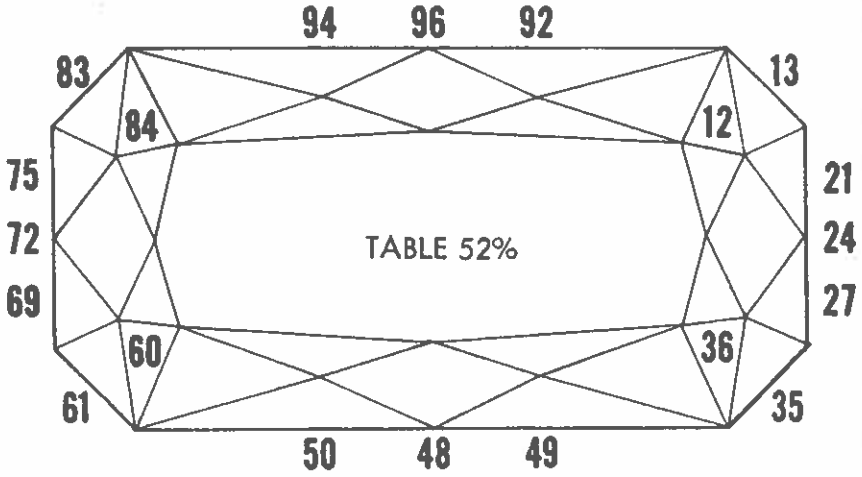
PAVILION



ANGLE	INDEX
42% 42% 42%	12-36-60-84 96-48 72-24
	CUT IN TABLE 70% OF THE WIDTH & POLISH
42%	2-50-46-94
Stars	
37 1/2% 37 1/2%	1 CL 1/2 49 CL 1/2 95 CR 1/2 47 CR 1/2
31%	69 & 75 CL 1/2 21 & 27 CR 1/2
Girdles	
45 1/2% 45 1/2%	1 CL 1/2 - 49 CL 1/2 47 CR 1/2 - 95 CR 1/2
46%	71-74-23-25
45%	Polish In 83-35-13-61

Polish in reverse order of cutting

CROWN



12 X 18 mm. will finish 10 mm. thick

Proportion 1/3 Crown 2/3 Pavilion the girdle must be 2 1/2 to 3 mm. thick after cutting the pavilion.

N. C. LAPIDARY SOCIETY
"STONE CUTTER"
Thomas J. Ricks
Route 3, Box 347
LIBERTY, N. C. 27298

BULK RATE
U.S. POSTAGE
PAID
LIBERTY, NC 27298
PERMIT NO. 60

ADAM J. GRZYB
6852 Jonquil Terr.
Niles, IL 60648